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DEPARTMENT OF AGRICULTURE

BUREAU OF
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7

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

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FRUIT INSECT INVESTIGATIONS

Moderate heat lethal to Cryptophagus sp.--Evidence that larvae and adults of Cryptophagus sp. are common in stored raisins during February, March, and April, but scarce or absent during the hot months, led to a test of the tolerance of full-grown larvae to a constant temperature of 84° F. George H. Kaloostian, of the Fresno, Calif., laboratory, exposed 6 lots, each of 20 full-grown larvae, to this temperature. The tests began on several dates during the first half of December 1939. The insects were in several types of containers. None were able to transform and all were dead after 5 to 18 days. Control lots kept at room temperatures of 50° to 84° for 50 to 56 days transformed to the extent of 0, 20, 35, and 90 percent, depending, apparently, on moisture conditions and on the presence of soil in which to pupate. During cool weather this unidentified species can be reared in abundance on a puppy-meal mixture (see News Letter, v. VI, No. 10, p. 3. Oct. 1, 1939), placed on soil and kept moist enough to promote a good growth of mold.

MEXICAN FRUITFLY CONTROL

No fruitfly larvae found in February.--No larval infestations were discovered during February in the Rio Grande Valley. This is the first time since 1936 that larval infestations have not been found in February. Usually, about 20 infested properties are located during this month, but the number of flies present in the groves this season appears to be below normal and the development of eggs somewhat retarded. From past experience, however, it is expected that infestations will be found early in March. The harvesting of freeze-damaged fruit was further complicated by windstorms on February 16, 17, and 18. The wind, which developed into a severe duststorm, reached a velocity of 45 miles per hour and caused an unusually large amount of fruit to fall. Certification of fruit for shipment in February amounted to 4,953 equivalent carlots. The total of shipments for the season was 21,290.9 carlots at the close of February.

JAPANESE BEETLE CONTROL

Weather interferes with plant shipments.--Although certification activities picked up somewhat during February, shippers for the most part were waiting for a break in the weather that would permit them to start filling orders already booked. The usual seasonal increase was delayed because of freezing temperatures and heavy snows during the month. Frost was still in the ground at the end of the month, with reports of frost from 12 to 24 inches deep in many sections of the Japanese beetle regulated area. Dahlia shippers were fairly active in sending out clumps to other growers for propagating purposes. Long Island dahlia shippers made many shipments to the South, and a few to California and other Western States. In the Long Island growing district, 48,000 roots, valued at $2,300, were certified during the month in conformity with State corn borer regulations. In New Jersey certifications increased 68 percent over those in February 1939 and 32 percent over January of this year. Weather conditions undesirable for extensive shipping worked to the advantage of the inspectors in the Salisbury, Md., area, as the available personnel there was barely able to handle the inspection and certification incident to the 950,000 plants shipped to points outside the regulated zone and to classified dealers within the area. A large grower in the Philadelphia area has 300,000 certified plants in storage for shipment waiting for the first warm spell. The cold weather is also reported as having retarded for about 2 weeks the emergence of adult Japanese beetles in run-hot greenhouses in the Philadelphia suburban district. A few adults were collected but no evidence of leaf feeding was observed. On Februery 20 a solitary live beetle was found on a lily blossom in an uncertified greenhouse on Staten Island. Root diggers in western Pennsylvania, who are usually active late in February gathering horseradish and other roots, were unable to ply their trade, as the lowlands were frozen.

Nurseries install preheating rooms for stock to be fumigated.--In order to meet the present requirements for a temperature of 65° F. before plants are fumigated with methyl bromide, a large New Jersey nurseryman is building a preheating room adjacent to a new 1,500-cubic-foot fumigation box. The plants will be kept in the preheating room until the insides of the soil balls reach the required temperature. A Connecticut nurseryman has begun the construction of a large chamber for the fumigation of evergreens. This chamber will be approximately 28 by 8 by 7 feet, with a 6-inch insulation of sawdust in the walls. It is being built at one end of his packing shed, with doors in the center of the chamber, one leading in from the packing shed and the opposite door opening outdoors. A heating unit is being installed with coils in the packing shed to preheat the plants before loading in the chamber. This will permit preheating of enough plants to permit continuous operation of the chamber if desired. After fumigation the plants will be taken directly outside. The total number of plants fumigated with methyl bromide at the end of the first year of its use is approximately 660,000. This is about 2 percent of the grand total of 33,000,000 plants shipped under certification from infested premises after some form of chemical treatment, or after they were made soil-free.

Grower may transfer southern plantings to Maryland nursery.--A grower in Maryland, who has extensive plantings both in Maryland and in one of the Southern States, is considering transferring all his stock to the Maryland location. This transfer is under consideration because of the grower's success in fumigating his plants in his large methyl bromide chamber. To date he has not lost a plant, nor has he had any complaints from customers. Checks have been made on treated stock sold to other growers for Easter forcing and thus far all treated plants are showing large buds and the plants themselves are far more vigorous looking than unfumigated stock. This shipper and another nursery in the same area required the services of an inspector daily during the month. There were 14,590 plants and 22,300 rooted cuttings shipped from these 2 establishments. The second nursery has contracted with one of the national 5- and 10-cent chains to supply 50,000 certified 3-inch gardenia plants for next season. Approximately 68,000 of this size gardenias were certified for this establishment during 1939.

Public conference to consider the Japanese beetle quarantine.--There was a large attendance of nursery-association representatives, State plant-pest officials, and other interested individuals at the public conference in the National Museum on February 27, to consider the present status of the Japanese beetle quarantine. This was the first public meeting to consider this quarantine since the hearing held on November 16, 1935. A unanimity of opinion was expressed for retention of the quarantine and continuance of its enforcement as a Federal project. Members of the Division at the hearing were E. G. Brewer, William Middleton, C. W. Stockwell, and R. W. Sherman. Copies of the report read at the hearing and supplemental data relating to 1939 trapping results, road-patrol activities, and Federal-State appropriations are avilable upon request to Bureau headquarters or to the divisional leader.

Extra revenue from methyl bromide fumigation chambers.--A grower in central Pennsylvania, who has built an approved fumigation chamber, is helping to pay for its construction by fumigating rugs, furniture, and other household articles for moths, and expects to build up an extensive side line in fumigation. Customers must bring and take away all articles fumigated, as the grower does not want to upset his regular greenhouse routine. A report from the district inspector in Ohio stated that a number of greenhousemen whose premises are uninfested with the Japanese beetle, and who are not obliged to fumigate or chemically treat their plants as a requirement for certification, are nevertheless planning to build fumigation chambers. These will be used exclusively for the control of general greenhouse pests wholly apart from any quarantine requirements.

Recommended greenhouse procedure fits in with certification requirements.--For a number of years the Ohio Agricultural Experiment Station has advocated steam sterilization of potting soil and manure used in greenhouses. Most of the greenhouses in the section of the State under regulation for the Japanese beetle are equipped for steam sterilization and therefore are in a position to meet one of the requirements for maintaining certified greenhouses under the quarantine regulations.

Trees dug by air hammer.--A classified nurseryman on Long Island, when called upon to dig and transport to Connecticut a consignment of 6 oak trees with 8-foot soil balls, met the situation by using air drills to cut out the soil balls. The order required that the trees be dug while the soil balls were frozen, so that there would be no injury to the property on which they were replanted. The trees weighed about 3 tons each, Certification of experimental material.--At Bartlett, N. H., the Northeastern Forest Experiment Station presented for gypsy moth inspection and certification two pieces of birchwood taken from a tree infested with the bronze birch borer. The wood was consigned to the Forest Products Laboratory at Madison, Wis., for study and experimental purposes. Numerous inspections and certifications under the Japanese beetle quarantine were made during the month of soil-free material at the U. S. Plant Introduction Gardens, Glenn Dale, Md. This establishment has started their spring shipments of plants to Southern States and to California and Texas. These shipments consisted of greenhouse plants and material from the nursery, which had been inspected last fall and placed in a certified cellar for winter storage. Shipments from this establishment will be made to almost every State in the Union before the end of April.

Inspect sportsmen's exhibit material for gypsy moth.--Thirty of the 120 exhibits that were on display at the Sportsmen's Show in Boston from February 4 to February 10 were inspected for gypsy moth infestation before they were moved to the New York Sportsmen's Show. Most of the products inspected were used in the woodland scenes set up by the States of Maine, New Hampshire, and Vermont. The material was moved to New York City via freight, express, and truck. One of the freight shipments was a complete dogsled outfit from central New Hampshire, consisting of 14 dog cages, 3 houses, 6 platforms, 16 cedar frames, 3 logs, 4 spruce trees, 8 posts, and 5 stumps. A gypsy moth egg cluster was found on 1 of the stumps. Eight gypsy moth egg clusters were found in the course of the inspection of 32 stumps, examined along with trees, slabs, pine needles, old sticks, stones, pine fencing, and pine benches, as part of an elaborate woodland exhibit. Some of the New England exhibitors had their material inspected at the point of origin before shipment to Boston and they were able to retain in the express cars sufficient inspected material for the New York show and leave the material used at the Boston show to be destroyed.

Gypsy moth infestations found among inspected forest products.--During February, 16 shipments of various types of forest products were found infested with gypsy moth egg clusters, a total of 98 clusters having been removed in the course of inspection. The most heavily infested shipment inspected was a carload of lumber examined at Bow, N. H., for shipment to Elizabethtown, N. J. Two carloads of lumber inspected at Conway, N. H., for shipment to Rochester, N. Y., yielded 18 and 10 egg masses, respectively. Lumber, birch logs, poles, and exhibit material were among the items found infested.

Diseased elm found in Ridgefield, Conn., swamp.--Laboratory culturing late in February confirmed the presence of the Dutch elm disease fungus in a 35-inch d.b.h. elm in Great Swamp, near Ridgefield, Fairfield County, Conn. Certain sections of this swamp have large numbers of devitalized elms still standing. Each year only the worst elms have been removed. This year, with diseased elms on all sides of the swamp, more thorough scouting and sanitation work was performed. The confirmed tree is about 3/4 mile north along the river from a confirmed tree located in the summer of 1939. It is about 100 feet tall, possibly 40 percent dead, and was sampled during the 1939 foliar season without finding sufficient discoloration beneath the bark to warrant submitting samples for culture.

The yellow chalk mark left by the scouts was still visible when the tree was removed. An examination after the tree had been felled showed that streaking was present throughout the trunk and large leaders but did not occur in any of the living parts of the smaller branches. One dead limb was infested with Scolytus multistriatus Marsh., but no emergence holes could be found. Some beetles may have emerged from a part of this limb that had fallen to the ground, but there were no emergence holes in the bark from the fallen limb. Finding of this diseased tree will necessitate considerable change in the work plans for this area. More thorough sanitation measures than heretofore practiced on clear-cutting of the entire swamp are anticipated.

Elm-sanitation crews given health examinations.--Seventy men, comprising elm-sanitation crews from Bergen, Morris, Passaic, and Sussex Counties, N. J., were transported to the Newark Watershed headquarters at Charlottburg, where watershed physicians and bacteriologists tested the men to determine whether or not they should be allowed to work on the watershed property. The Newark Watershed Commission required that everyone working on the shed be a noncarrier of typhoid fever, have no lung condition, and be free from certain other diseases that may be transmitted through the water supply.

Trunk sampling discloses first-record infection.--Isolation of Ceratostomella ulmi from samples taken from the trunks of two elms on Newbold Island, in the Delaware River about 5 miles south of Trenton, in Mansfield Township, Burlington County, N. J., was reported by the laboratory in mid-February. The two trees are located in a swampy section of the island, affected by tidewater, and are approximately 1,000 feet apart in a heavy elm concentration. These samples were collected on January 23 by a crew assigned to special winter scouting. These are the first confirmations in this township and will add several square miles to the infected zone and the work area.

FOREST INSECT INVESTIGATIONS

Fungus associated with Cylindrocopturus injury in pine reproduction.--C. B. Eaton, Berkeley, Calif., reports that investigations made by C. T. Rumbold, of the Bureau of Plant Industry, on material sent in from Big Springs Plantation, Lassen National Forest, have disclosed the presence of the fungus Hormiscium gelatinosum Hedgc. (Syn. Pullularia pullulans (de By.) Berk.), with all active stages of the weevil and its work. The fungus was recovered in a high percentage of cases from larval galleries in the phloem and wood, and also from the feeding punctures made by the adults in pine needles. It appears to be almost universally associated with Cylindrocopturus damage in pine reproduction in the Hat Creek area. This fungus is a vigorous wood stainer which is of economic importance in the lumber industry. Its pathogenicity to young pine seedlings, independent of the insect, has not yet been demonstrated.

Dendroctonus valens unable to kill ponderosa pine poles retained as crop trees.--Mr. Eaton also reports that investigations on the Fandango Logging Chance, Modoc National Forest, have shown that thinning stands of ponderosa pine and white fir poles in favor of the pine resulted in numerous but unsuccessful attacks of the red turpentine beetle (D. valens Lec.) on the remaining trees during the first year after cutting. Nearly 15 percent of 240 ponderosa pine poles, which were released to varying degrees by cutting out the competing trees, were attacked, but the beetle was not successful in causing death of a single one. Analysis of the data obtained in this study shows that the incidence of attack was nearly 8 times higher where 1 of twin or multiple pine stems was retained than where only single stems were involved.

Vigor of host material influences density of mountain pine beetle attack.--In a report on the relationship between infestations of the mountain pine beetle and types of host material, W. D. Bedard, of the forest-insect laboratory at Coeur d'Alene, Idaho, states that tree vigor is one of the most important factors governing the density of attack. This variation in tree vigor materially influences the number of attacks per square foot, because in normal trees there may be as many as 36 attacks per square foot--5.2 for trees of reduced growth, 2.7 for root-diseased trees, and 2.1 in wind-thrown trees. This difference in the density of attack plays an important part in determining the importance of an infestation, as an increase or decrease in the number of attacked trees can result from a change in the type of material being attacked without any change in total beetle population.

Control of Pineus pinifoliae on white pine.--J. C. Evenden, Coeur d'Alene, states that plans are being made to test the possibility of reducing or eliminating damage to white pine plantations by Pineus pinifoliae Fitch. This project will be located in a white pine plantation within the Pilgrim Creek drainage of the Cabinet National Forest. During the first season a number of small plots will be treated with various sprays in order to arrive at a satisfactory method of control. This work is being instituted in cooperation with the Forest Service, with C. C. C. enrollees being used as laborers.

A new sawfly on pine.--C. L. Griswold, of the Morristown, N. J., laboratory, reports that another sawfly has been found to feed on pine. On July 8, 1938, H. A. Fiedler, of the New York State Conservation Department, found two sawfly larvae on the new growth of red pine at Suffern, N. Y. These were sent to the Morristown laboratory for identification. It was not possible to determine the larvae. One was preserved and the other placed in a rearing container with red pine foliage. It fed for a few days and then entered the soil. A female adult issued on May 23, 1939. This specimen has been determined by Grace A. Sandhouse as Acantholyda pini Rohwer. Miss Sandhouse states that the National Collection contained only the type (female) of the species and a doubtfully associated male.

Parasitization of oriental hag moth cocoons higher in heavy than in light infestations.--According to P. B. Dowden, New Haven, Conn., the Oriental hag moth (Cnidocampa flavescens Walk.) infestation in the vicinity of Boston, Mass., has increased rapidly in the last few years, particularly north of the city at Cambridge, Medford, and Somerville. A total of 1,160 hibernating cocoons were collected in the spring of 1939 at 13 out of 17 observation plots established several years ago. Parasitization by the introduced tachinid Chaetexorista javana B. & B., ranged from 1 to 49 percent. In general, the heavier infestations showed higher parasitization than did the lighter infestations. In addition, 2,789 cocoons from 31 collections made near Boston by F. W. Marshall, of the Massachusetts Conservation Department, were dissected. Parasitization of this material ranged from 3 to 32 percent, the heavier infestations again showing the higher parasitization.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Weather responsible for much loss of time on gypsy moth work.--Gypsy moth working conditions were markedly unfavorable during most of February in the larger part of the area where control methods are in progress. An ice storm in the Berkshire area of Massachusetts during the first week left the tree growth on high elevations heavily coated with ice, and ice- and snow-packed roadbeds, both in this area and in the greater part of Vermont, made travel by automobile slow and difficult. A severe snowstorm, accompanied by high wind, started late on February 13, covering the area from the Massachusetts-Vermont border south into Pennsylvania. The snowfall continued unabated until the morning of February 15 and the wind, blowing at gale force, persisted for fully 24 hours after the weather had cleared. The blanket of snow, ranging from 10 to 18 inches deep, was piled into drifts up to 15 feet or more in depth.

Gypsy moth work in Vermont not seriously handicapped.--Up to the middle of February, 8 gypsy moth infestations had been located in Middlebury, Addison County, Vt.. At the largest colony, where work is still incomplete, 57 new gypsy moth egg clusters were found and creosoted. The other infestations ranged in size from 1 to 30 egg clusters, most of them being small. At these infestations, as well as at other infested areas in Vermont, intensive gypsy moth work was temporarily discontinued the latter part of February, as deep snow had covered ground litter, rocks, butts of trees, and low growth and prevented a thorough examination of this material for egg clusters. However, scouting work in general progressed satisfactorily on days when the weather conditions permitted, although the snow-blocked roads forced the men to walk longer distances from the points that could be reached by truck to the areas where their work was to be done.

Scouting continued to prevent future wind spread of gypsy moth caterpillars.--Several crews continued to confine their scouting to the high and exposed elevations, when conditions were favorable, in the townships bordering the barrier zone, in the Berkshire region of Massachusetts, on the east, in order to locate and creosote a maximum number of gypsy moth egg clusters before hatching time. This work will reduce the numbers of newly hatched caterpillars that might be spread into the barrier zone by the wind.

Woodlots examined for gypsy moth before logging starts.--Gypsy moth field supervisors in Massachusetts have reported that numerous small logging operations were under way in various localities in Berkshire County. Most of the operators were limiting their cutting to certain species of trees, such as paper birch to be used in the manufacture of spools, white ash for rake handles, and other trees for specialties manufactured in that region. In most instances the top wood was to be sold for fuel. The wood lots where the cutting was in progress or was about to start were carefully examined so that any existing gypsy moth egg clusters could be creosoted before they had been disturbed, and also before they could be transported into uninfested areas on logs or rough lumber.

Treatment work modified because of heavy snowfall.--Treatment work at gypsy moth infestations in Massachusetts and Connecticut, which had been in progress for some time, was necessarily modified during the latter part of February because of the heavy snowfall in those States. The burning of previously assembled brush and trash wood could not be continued, as the brush piles were deeply buried under the snow. The removal of bushes, vines, and other low growth was also temporarily discontinued, as the digging away of the snow to permit cutting close to the ground would entail much loss of time. Cutting work was restricted to the removal of the larger dead and defective trees during this period.

New gypsy moth infestation found near previously infested location.--Another infested spot was located about ¼ mile from the original gypsy moth infestation in Southbury, New Haven County, Conn., where much intensive work has been in progress since early in the winter. So far as has been determined, the new location centered around a large white oak tree, on which all except one of the egg clusters found were completely hidden under the shaggy bark.

New gypsy moth infestations found in Pennsylvania quarantined area.--During the latter part of February additional gypsy moth infestations were discovered in the townships of Scranton and Clifton, both of which are located within the quarantined area of Pennsylvania, in Lackawanna County. Treatment work at these infestations will be deferred until the snow melts, permitting the examination of dead wood and debris for egg clusters, and other exterminative work.

Storage facilities increased in Pennsylvania.--Alterations started some time ago on two of the temporary buildings at the gypsy moth storage plant in Moosic, near Pittston, Pa., have been virtually completed and the buildings will be ready for use as soon as the earthen floors are graded. The space thus made available for the storage of large trucks and bulky equipment is urgently needed and will be put into use immediately. A spraying machine, filled with water and with several lengths of hose attached, is kept in a heated storage building nearby ready for instant operation in case of fire.

Report of C. C. C. gypsy moth work for first half of fiscal year 1940.--The quarterly report of the C. C. C. gypsy moth work east of the barrier zone under the direction of this Bureau for the period from October 2 to December 30, 1939, shows a considerable increase in the number of man-days used in gypsy moth work over the number available during the first quarter of the fiscal year. About 10,000 6-hour man-days were used on gypsy moth work during the first quarter, whereas approximately 15,000 man-days were available during the second quarter. The C. C. C. gypsy moth work for the first half of the fiscal year was done on approximately 22,000 acres, and woodland thinning to reduce the percentage of favored food plants was done on slightly more than 720 acres. This has resulted in the destruction by creosoting and burning of more than 312,000 new gypsy moth egg clusters. In Connecticut the C. C. C. enrollees were employed on gypsy moth cleaning and thinning work during the larger part of the first half of the fiscal year, but early in February they began to do rapid scouting to discover pockets of severe infestation which should be sprayed during the coming summer. This work has disclosed a large spread of the gypsy moth in the area just east of the barrier zone in Connecticut, but no exceptionally heavy pockets of infestation, such as were present last summer, had been located by the end of February. Scouting by a State crew in Connecticut during a large part of the first half of this fiscal year has shown some spread of the gypsy moth in the towns of Colebrook and Harwinton, which border the barrier zone in the northern part of the State.

C. C. C. gypsy moth work reduced in February.--While approximately 2,600 6-hour man-days were used on gypsy moth work by C. C. C. enrollees during the week ended February 3, this amount was gradually reduced until only 1,000 man-days were used toward the end of the month. Heavy falls of snow on several occasions during this period contributed to the reduction by blocking the roads so that it was impossible for the men to travel to their work, and the men were used on snow-removal work around the camps. In addition to this, many enrollees who had been returned to gypsy moth work early in the month were reassigned for burning brush in connection with work in forest-fire-hazard reduction, and 2 crews of approximately 20 men each were removed from the supervision of this Bureau and assigned to do silvicultural work under the direction of the State forester of Connecticut in a lightly infested section between the Connecticut River and the barrier zone, in the southern part of the State.

Proposed C. C. C. gypsy moth spraying to be done cooperatively.--Spraying of dangerous gypsy moth infestations with arsenate of lead in Massachusetts and Connecticut east of the barrier zone will be done through the cooperation of the C. C. C., the Federal Bureau of Entomology and Plant Quarantine, and the States concerned. State officials in Massachusetts and Connecticut have requested the C. C. C. to purchase three spraying machines with a working capacity of 1,000 pounds, and, if delivery of the new equipment is delayed, Federal machines will be loaned by the Bureau for the spraying work. In Massachusetts the proper C. C. C. official has agreed to ask for the purchase of 5 tons of lead arsenate and 6 barrels of fish oil, and to increase this order if sufficient funds are available; whereas in Connecticut the State Forester will ask the C. C. C. to purchase 25 tons of lead arsenate and 26 barrels of fish oil. The State gypsy moth department of Connecticut has agreed to furnish a part of the State force to assist the C. C. C. in the spraying work. The State is also using one of the State crews to do rapid scouting work in an area between the Connecticut River and the barrier zone in the northern part of the State, to determine the areas where spraying should be done in sections east and south of the area that can be reached for scouting by the C. C. C. This crew is also engaged in locating two plots in this area that would serve for demonstrational spraying by autogiro. The force of the Connecticut State entomologist will locate a field that can be used as a landing station for autogiros.

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PLANT DISEASE CONTROL

Barberry-infested areas reinspected in Iowa.--In 1939 barberry bushes were found on 189, or approximately 30 percent, of the 620 old properties reinspected in Iowa. Normally this is between 15 and 20 percent. The higher figure for 1939 is accounted for by the fact that resurveys were made in 8 of the larger areas of infestation in this State, 6 of which had not been given attention since 1932. D. R. Shepherd, in charge of control work in Iowa, comments as follows upon resurveys made last year: "It was found that the length of intervals between surveys can best be determined by checking the area to see the extent of regeneration and the size of the bushes, rather than to schedule resurveys at intervals of a certain number of years. The fruiting bushes found this year were mostly 5 or 6 years old and for that reason were missed as small bushes on the previous survey. The time of year of the previous survey and the nature of the area determined to some extent the number of bushes missed on the previous survey, and thus the number of large bushes that were found this time. In other words, fewer bushes would have been missed in some of the areas if they had been worked at a time of year when there was less foliage on the underbrush and when there were fewer weeds." According to Mr. Shepherd, it was noticeable that most of the bushes found in counties where no work had been done since 1932 were from 12 to 30 inches in height. There were few large bushes and only a negligible number of seedlings, indicating that most of the seed in the ground had germinated and that little regeneration would be expected in the future.

State W. P. A. projects approved for two States.--In Colorado a supplementary W. P. A. (State) project has recently been approved for barberry eradication in 5 counties--3 in the San Juan Basin and 2 in the San Luis Valley. Work was undertaken on January 29. In Minnesota a supplement to a State W. P. A. project, that has been in operation in Minnesota since January 1939, was recently approved. L. W. Melander, in charge of control work in Minnesota, reports that the procedure followed in connection with the State project was almost identical with that applicable in the case of Federal Agency projects. The only difference was in the mobility of crews. A Federal Agency project in Minnesota operates on the basis of 10-man units transported in small trucks. The State project crews are hauled to and from work in 1½-ton trucks and 20 men are considered a unit. Areas selected for survey with State crews, however, permitted effective use of the larger units. During 1939 survey work under the State project was conducted in Carver, Le Sueur, Olmsted, Rice, Scott, Sherburne, Winona, and Wright Counties. More than 450 barberry bushes were found on 54 different properties.

Blister rust control on national forests in North Central Region.--In 1939 initial protection was given to 5,375 acres of native pine, 6,639 acres of planted pine, and 360 acres of white pine planting sites within the boundaries of the 8 National forests of Minnesota, Michigan, and Wisconsin. In this work 9,661 man-days were spent in the removal of 1,246,136 Ribes from 33,537 acres of control area (white pine plus protective zones). To date, 47,011 acres, or 53.6 percent, of native pine, and 42,570 acres, or 92.4 percent, of the planted white pine have been initially protected within these national forests. There are also 2,966 acres of planting sites protected, to which white pine has been allotted. White pine plantings, in the amount of 45,887 acres, represent 11 percent of the successful reforestation program in Region 9 of the Forest Service. Cumulative totals show that up to December 31, 1939, 78,689 man-days have been expended in the initial eradication of 16,505,292 Ribes from 236,607 acres of control area.

Notes from blister rust field men.--District Leader F. H. Rose, of Vermont, writes that while working in the field he came in contact with a man who was producing knotty white pine lumber to be used for inside finish. He informed Mr. Rose that he was receiving $100 per thousand board feet for this material and that even knotty white pine is graded, the size and shape of the knots determining the grade. The knots most preferred are large and flaring rather than round. R. G. Pierce, in charge of blister rust control work in the Southern Appalachian States, writes that Ribes leaves the size of a dime were observed on February 24 on Ribes cynosbati at Fawley Hollow, Rockingham County, Va. State Leader Oscar J. Dowd, of Ohio, writes that the Soil Conservation Service there plans to furnish 323,000 white pines for spring planting, in addition to those purchased by individual cooperators. They believe white pine is the best tree for reforestation in Ohio.

Safety sling for men working in hazardous areas.--H. R. Offord writes that a heavy canvas sling has been constructed by Mr. Winslow, of the Berkeley, Calif., blister rust office, for use of men working in steep, hazardous places. Next summer Ribes-eradication work is expected to be undertaken inside the rim of Crater Lake, where the men will have to use ropes to work steep cliffs. A safety catch, which will prevent the supporting rope from running except at the will of the worker, will also be devised. Messrs. Offord and Winslow personally tested the sling and report that it proved to be comfortable and practical, permitting the worker to have the freedom of both hands and feet for working and for protection against bumping on rocks. Some improvements in the harness have yet to be made.

Control work in Northeast handicapped by snow.--Field operations in blister rust control work were badly handicapped by the heavy February snows. In some towns it was necessary to temporarily discontinue white pine mapping work because the trees were heavily laden with snow, and deep snow made the roads unsafe to travel. Snowshoes were required for field work in Connecticut and some of the back roads were so blocked that the crew men were unable to get near their work.

COTTON INSECT INVESTIGATIONS

Pink bollworm in lower Rio Grande Valley.--A study was undertaken in July 1939 by L. C. Fife and W. T. Hunt, with several assistants from the Division of Pink Bollworm and Thurberia Weevil Control, to determine the importance of the resting stage in maintaining the pest from one cotton crop to the next. It was found that long-cycle larvae occurred under several different environments in the field as early as the latter part of July. Examinations of open cotton bolls on the soil surface and on standing stalks in the Matamoros area of Mexico showed the presence of many resting larvae during December, January, and February. A total of 1,762 open bolls examined in January from 25 fields near Matamoros contained 14 live pink bollworms, or about 1 worm per 125 bolls. Only a few bolls remained in the fields during February, but live larvae were found following the low temperature of 25° F. at Brownsville. Nearly 10,000 bolls collected from a number of localities in Texas in January and February were also examined. Live resting larvae of the pink bollworm were found in bolls from Hebbronville, Benavides, Crestonio, and Mercedes. A rather heavy infestation occurred in the green bolls during the latter part of the season in 2 fields near Hebbronville, about 130 miles northwest of Brownsville. Eight live worms were found in 607 bolls collected in this locality in January. The most northern point at which live worms were found in February was at Benavides, in Duval County, about 160 miles northwest of Brownsville, where 1 live worm was found in 911 bolls examined. No live worms were found in the bolls examined in January and February from the Corpus Christi-Robstown-Kingsville area, where the infestation last season was lighter. More larvae have been found in bolls on standing stalks than in bolls on the ground. Examinations were made in February of 1,334 old bolls from 10 fields in the vicinity of Brownsville, which were cleaned in August 1939, or prior to the September rains, to determine whether the rains caused the resting larvae to pupate and emerge, or whether they remained in the diapause throughout the closed season. Many of these bolls were badly decomposed and a large percentage of the seeds were eaten by rats. No pink bollworm larvae were found. Old okra pods were also found to harbor larvae in the diapause. Twenty live resting larvae were found in December in examining 300 dry okra pods from stalks cut and piled in October while green. These facts show that okra and old open cotton bolls play an important part in perpetuating the pink bollworm during the closed season of cotton production. Examinations to determine the presence of pink bollworm larvae in the soil were made in September, December, January, and February. A total of 592 square yards of soil, from 3 to 6 inches in depth, were examined from the most heavily infested cottonfields. Several hibernating larvae were found in partially decomposed cotton bolls that apparently had been buried for a considerable period, but no larvae were found in free cocoons in the soil. From the examination of bolls on the stalks, it seems logical to expect a greater number of larvae in bolls on the soil surface than has been the case, and to find larvae in free cocoons in the soil. In the fields inspected most of the surface trash has been partially decomposed or a large part of the seeds eaten by rats. Also most of the larvae have been found in small, partially open bolls produced late in the season which were subjected to a more intensive infestation and to conditions more favorable for producing resting larvae. These late bolls are more likely to remain attached to the plants. The cold wave in January killed all of the growing cotton and okra and the extended dry spell has prevented new growth of these and other malvaceous plants, and has delayed the planting of a large portion of the crop. Data obtained to date indicate that larvae are overwintering only in old cotton bolls and okra pods, and in comparatively small numbers.

Calcium arsenate containing different percentages of water-soluble arsenic pentoxide for boll weevil control.--Experiments on boll weevil conducted in 1938 at several localities, with calcium arsenates containing on the average 0.5, 4.6, and 10.3 percent of water-soluble arsenic pentoxide, as determined by the New York method, were repeated at 5 localities in 1939. These calcium arsenates have been designated as low, intermediate, and high, respectively. The tests included 68 replications. The average weevil infestation during 1938 and 1939 in the plots treated with low was 18.9 percent, intermediate 17.6 percent, high 17.2 percent, and untreated checks 34.7 percent. The average yield in 1/60-acre plots treated with low was 24.1 pounds per plot, intermediate 23.2 pounds, high 23.3 pounds, and untreated checks 19.6 pounds. The differences between the infestations and the yields in the plots treated with calcium arsenate varied significantly at the 1 percent level from the infestation and yield in the untreated checks, but there were no significant differences among the infestations and yields in the plots treated with the calcium arsenates containing low, intermediate, and high percentages of water-soluble arsenic pentoxide.

Low winter temperatures and boll weevil mortality.--Many people are inquiring as to what effect the unusually low temperatures that occurred throughout the Southern States during January had on the boll weevil population. It is still too early to make definite statements on this subject. The problem is complicated by the fact that in many places the weevils were protected because the ground was covered with snow when the minimum temperatures occurred. At Tallulah, La., freezing temperatures were recorded on 20 days in succession. Beginning on January 14 and ending on February 3, the minimum temperatures in degrees Fahrenheit were recorded as follows: 32, 23, 20, 28, 20, 7, 11, 14, 18, 21, 10, 8, -5, -8, 11, 18, 27, 17, 22, 28, 30. On 5 days, from January 23 to 27, the maximum temperature did not go above 32° F. On November 4, 1939, in each of 6 screened cages (size 4 by 4 by 4 feet), containing Spanish moss, 500 weevils were released. The contents of 3 of these cages were examined during the first week of January and the percentage of weevils alive recorded as 24.9, 12.3, and 9.0 percent. In 3 other cages examined on February 1 no living weevils were found. In another cage containing surface trash, where 50 weevils had been released on December 18, no live weevils were found on February 6, when 45 dead weevils were recovered from the 50 placed in the cage on December 18. The records thus far obtained indicate that there will be a very low survival of boll weevils in the vicinity of Tallulah this spring.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Planting of the 1940 cotton crop in lower Rio Grande Valley.--A restricted planting period, between February 20 and April 1, was established by the State department of agriculture for the 1940 cotton crop in the lower Rio Grande Valley district of Texas. This step was taken in an effort to shorten the cotton-growing season and intensify the control program in that area, where infestation has steadily increased since the initial finding of the pink bollworm in the Brownsville-Matamoros area in 1936. There were only three violations of this planting regulation, and it is believed these were due to misunderstandings on the part of the farmers concerned. The total acreage involved in the violations was very small, and was destroyed by the operators immediately following the request by the State department of agriculture that this be done. General planting was begun on February 20, mostly on lands previously irrigated;

however, only a very small acreage had been planted at the close of the month, owing to cool nights and lack of rainfall throughout the entire area. The effects of the drought on the preparation of land for the 1940 crop have been more pronounced in the Mexican areas than on the American side, owing to the fact that only a few thousand acres of land in that region is subject to irrigation. Although only a small area was subject to a restricted-planting date on the Mexican side of the Rio Grande, seed dealers in that area cooperated with the pink bollworm program to the extent that they refused to deliver seed to the farmers until after February 20.

Destruction of soca cotton and random plants in south Texas regulated area and lower Rio Grande Valley of Mexico.--Following the completion of the planned 1939 stalk-destruction program in the south Texas regulated area, sprout plants continued to develop on 1939 cotton acreage. Thus, in order to maintain a host-free period until the fruiting of the 1940 cotton crop, it was necessary to go into the fields with crews of Bureau laborers and grub out these random plants. Soca cotton in abandoned fields also continued to be found throughout the area. The above situation pertained especially to the lower Rio Grande Valley area, and while all tender growth on cotton plants was killed in that section during a freeze late in January, it soon developed that these plants were rapidly reviving and that it would be necessary to continue this phase of the control work. About the first of February a recheck of the entire lower valley area was begun, and at the end of the month crews had practically completed the coverage and had grubbed scattered plants from 1,186 acres of 1939 plantings and 9,971 acres of soca cotton. Normally, in the lower Rio Grande Valley, all of the cultivated area is plowed and prepared for planting by the farmers late in January and in February. This general farming practice would thus remove practically all remaining cotton growth; however, owing to the unprecedented drought throughout the entire area, only the irrigated sections had been put into cultivation at the end of February. This condition has resulted in a large acreage, on which some unplowed stubble exists, therefore it will be necessary to maintain a sufficient number of crews through March to continue this work. The stub situation in the Matamoros area of the lower Rio Grande Valley of Mexico is about the same as on the American side; that is, on lands too dry to be prepared for planting, occasional stubs were beginning to put on growth at the close of the month, and a few plants were found bearing very small squares. In such instances, the farmers involved were being required by the Mexican Department of Agriculture to grub out the plants. In the Coastal Bend district of the south Texas area, several fields of scattered soca were found and destroyed during the period and a number of 1939 cotton fields were cleaned during the month in which material was becoming a menace. Not much cotton was found in any of the locations, and it is believed that most of the remaining plants in that area will be destroyed through the regular course of crop preparation, before they begin fruiting.

Field clean-up in the Glendale area of Arizona.--Gin-trash inspection of the 1939 cotton crop in Arizona revealed that a fairly heavy pink bollworm infestation existed in approximately six fields in the Glendale section of the Salt River Valley. As a result of this condition, field clean-up of approximately 3,000 acres of cotton land was begun early in January. Much of this acreage was extremely difficult to clean, owing to an unusual amount of material remaining in the fields. Also, for various reasons, a great deal of shattering of seed cotton and debris had occurred, making considerable hand-raking and picking necessary. Clean-up operations in this area were practically finished at the end of February and, notwithstanding the many difficulties involved, a very satisfactory program was accomplished.

Situation in the Big Bend.--Control measures, similar to those employed under the two-year plan for the 1938-39 crop season, so effective in reducing pink bollworm infestation in the Big Bend, are being carried out in the Big Bend area of Texas for the 1940 crop season. Cottonfields were cleaned in that area immediately following the harvesting of the 1939 cotton crop, and on January 29, 1940, the State commissioner of agriculture issued a proclamation making it mandatory that no cotton be planted in Presidio County prior to April 20. Also, no stub cotton will be allowed to grow in that county prior to the planting date. Farmers in that area as a whole appear very agreeable to the regulations governing the control program and it is expected they will conform 100 percent in regard to the delayed-planting date. Excellent cooperation is being received from the Mexican Department of Agriculture in carrying out similar control measures for the Ojinaga district of the Big Bend of Mexico.

Wild-cotton eradication.--An effort to eradicate wild cotton from southern Florida and adjacent keys was begun several years ago when it was found that these plants were heavily infested with the pink bollworm, from which infestation was spreading to domestic cotton plantings in the northern part of the State and in southern Georgia. Very good progress was made in the elimination of wild cotton during February. As during January, 12 W. P. A. crews, 2 Bureau crews, and a company of C. C. C. enrollees, were engaged in this work. The C. C. C. enrollees are operating in the Cape Sable area, where approximately half of the wild cotton acreage is found. During the first week of the period, 25 Bureau workers were established in a small camp located near the C. C. C. camp, and 2 W. P. A. crews were transferred from Key Largo to the Cape Sable section to assist in wild cotton eradication in that area. The first cleaning of the Cape Sable area for this season was completed at the end of February. A total of 5,778 acres was cleaned, from which 11,578 plants with mature bolls, 461,714 seedling plants, and 1,974 sprout plants were removed. A second cleaning for the season was completed in the Key Largo and Matecumbe sections, and in the Key West, Marathon, and Fort Myers sections good progress was made toward completion of second cleanings for the season. For the entire Florida area, approximately 7,470 acres was cleaned in February and 11,803 plants with mature bolls, 457,959 seedlings, and 2,027 sprout plants were located and destroyed.

Thurberia-plant eradication.--The project for the destruction of Thurberia plants in the Santa Catalina and Tortillita Mountains of southern Arizona, which was begun in 1935, is now nearing completion. The removal of Thurberia plants from these 2 mountain ranges, which were at the inception of this program nearest to commercial cotton plantings, was undertaken when it was found that they were infested with a weevil that attacks domestic cotton, and that they also afforded a possible host to the pink bollworm. Following a second coverage of the Tortillita Mountains, a recheck of the Catalina Range was begun and in February 4,040 acres was covered and 29,557 Thurberia plants were located and destroyed. On this second coverage it is gratifying to find that only a very small number of plants were missed during the first clean-up.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Relative susceptibility of certain crucifers to cabbage caterpillar.--In a series of replicated field plots containing green cabbage, red cabbage, collards, cauliflower, broccoli, kale, Brussels sprouts, and kohlrabi, C. E. Smith and R. W. Brubaker, of the Baton Rouge, La., laboratory, found during the fall of 1939 that there were significant differences between the caterpillar populations supported by some of these crops. This appeared to be influenced to some extent by the size of the plants, the stage of maturity, and the duration of the crop period. The species of insects involved in these tests were the cabbage looper, the imported cabbage worm, the diamondback moth, the cabbage webworm, the cross-striped cabbage worm, and several species of Agrotinae, consisting principally of the corn ear worm and cutworms. The percentage of total caterpillar population found on each of the crops in September and October 1939, was as follows:

Cauliflower-------	18.3	Red cabbage----------	12.2
Broccoli----------	18.2	Green cabbage--------	7.3
Brussels sprouts--	16.2	Kohlrabi-------------	6.5
Collards----------	15.2	Kale-----------------	6.1

Although green cabbage was among the crops carrying the heavier populations during September and up to about October 20, the population on this crop decreased markedly thereafter in comparison to those on several of the other crops. Apparently this phenomenon was due to the maturing of the crop and possibly to the fact that the lepidopterous adults were attracted for oviposition to some of the larger sized plants in plots where the other crops included in this series of tests were growing. Data obtained in these experiments indicate that red cabbage was just as susceptible to the species of caterpillars involved as was green cabbage and actually supported a larger population. Kohlrabi supported a relatively low population, attributable apparently to its relatively small volume of foliage and the low growth of the plants and not to any dislike for the crop. Kale was apparently less desired by the caterpillars than any of the other crops, which could not be accounted for, unless it was due to the extremely crinkled foliage, which may have influenced egg deposition. Although previous field observations had indicated that the caterpillar population on cauliflower in Louisiana was ordinarily composed largely of the cabbage looper, the data obtained in these tests demonstrated that under some conditions at least, the imported cabbage worm may be considered as an important pest of cauliflower in this section.

Cube constituents are ad-absorbed by raspberry roots and translocated to leaves, canes, and fruits.--In tests performed by B. J. Landis and W. W. Baker, of the Puyallup, Wash., laboratory, in cooperation with R. A. Fulton, Columbus, Ohio, in connection with experiments on the control of Byturus unicolor Say, it was shown by the goldfish method of testing that the constituents of cube, applied to raspberry plants, were ad-absorbed by the roots and translocated to the leaves, canes, and fruits, when applications of the ground root were made to the soil. Quantities of toxic materials lethal to goldfish were present in raspberry canes 194 days after cube powder had been applied to the roots. No toxicity to goldfish was detected in samples of leaves and canes of plants sprayed in 1937 and 1938 and analyzed in 1939. No evidence of toxicity was detected in raspberry fruits, which had been covered with cellophane and the vines treated three times with rotenone-bearing materials. The extracts made as late as 143 days after application from raspberry canes sprayed once with cube in water caused mortality to goldfish, whereas extracts from canes protected from the application produced no mortality. Raspberry leaves collected 56 days after the last of three sprays containing cube were applied caused mortality to goldfish. No significant differences in mortality to goldfish were observed when opposed to extracts of samples of raspberry leaves that had been sprayed with cube alone or with a spray containing cube and a sulfonated alkylated diphenyl as a wetter and spreader.

Wireworm injury to potato seed pieces reduced by applying sawdust treated with dichloroethyl ether.--M. W. Stone, of the Ventura, Calif., laboratory, reports that in a preliminary experiment performed in 1939, injury to potato seed pieces by wireworms, principally the sugar beet wireworm (*Limonius californicus* Mann.), was reduced markedly by a sub-surface application of sawdust treated with dichloroethyl ether mixed with the fertilizer and drilled in with the seed pieces. The drill was set so that the mixture was placed at a distance of about 2 inches on either side of the seed pieces and at a depth of 4 inches, corresponding with the planting depth of the potatoes. An examination of the seed pieces on the 7th, 11th, 14th, and 17th day after planting disclosed that of 90 seed pieces examined only 4 wireworm larvae were found in the rows treated with the dichloroethyl ether mixture, as compared to 99 larvae in 90 seed pieces taken from untreated rows grown under comparable conditions. In a series of soil samples, it was found that on an average there were 0.93 living wireworm larva per ½ square foot in the treated row, as compared to an average of 4.4 wireworms in the same unit area of the untreated rows. As no dead larvae were found in the seed pieces from the untreated row, it was apparent from the general results obtained in this experiment that the designated mixture containing dichloroethyl ether was effective in either repelling or killing wireworms attacking potato seed pieces.

Flight of sweetpotato weevil adults important in spread of infestation.--K. L. Cockerham and O. T. Deen, of the Sunset, La., laboratory, report that, as a result of experiments performed during 1939, the flight capabilities of adults of *Cylas formicarius* (L.) have been shown to be a greater factor in the spread of infestation than had previously been observed. Trap patches of sweetpotatoes planted at various distances from the only known source of infestation showed that 44.9 percent of the plants were infested at a distance of 940 yards, 15.8 percent at a distance of 1,320 yards, and 30 percent at a distance of 1,760 yards from the point of dispersal.

Calcium arsenate, paris green, or cryolite effective against beet armyworm on lettuce.--K. B. McKinney, of the Phoenix, Ariz., laboratory, reports that experiments against *Laphygma exigua* (Hbn.) as a pest of lettuce in the Salt River Valley in 1939 demonstrated that this pest may be effectively and economically controlled by the application of calcium arsenate undiluted, or paris green and lime (1-6), or cryolite and clay (1-2) applied at the rate of from 15 to 20 pounds per acre, a few days before thinning the lettuce. This method of combating the beet armyworm practically eliminated the loss or injury to small lettuce plants which very often occurs immediately after the plants are thinned.

Fall populations of beet leafhopper low in San Joaquin Valley.--The results of a survey conducted by M. F. Bowen and G. T. York, of the Modesto, Calif., laboratory, disclosed that the fall population of *Eutettix tenellus* (Bak.) on Russian-thistle (*Salsola pestifer* A. Nels.) in the San Joaquin Valley of California was lower than it has been during the 6-year period 1934-39, inclusive, and approximated 6,575 millions, or approximately one-ninth of the estimated number of leafhoppers present in this same area during the corresponding period of 1938. The nearest approach to this low figure was in 1935, when the population of leafhoppers on Russian-thistle in the San Joaquin Valley was estimated as about 8,206 millions. This decrease in leafhopper population is attributed principally to the reduction in the acreage occupied by Russian-thistle this year, as compared to 1938, together with the fact that the population of the leafhopper in the two principal areas where Russian-thistle occurs was markedly lower this season than in any previous year.

INSECTS AFFECTING MAN AND ANIMALS

Control of short-nosed ox louse.--O. G. Babcock, of the Sonora, Tex., laboratory, has been working on the control of *Haematopinus eurysternus* Nitz., a cattle pest which has shown considerable resistance to the standard insecticides. Concerning tests with a mixture of cube, sulfur, and water used as a dip, Mr. Babcock writes as follows: "During the past year a sufficient number of cattle were dipped in the cube (containing 5% rotenone)-sulfur dip to show that this dip is practical and will kill all lice present, but not the eggs. The minimum lethal dose seems to be 2½ pounds of the cube and 50 pounds of sulfur in 1,000 gallons of water. More work is needed to determine the value of extracts of derris, as well as of cube, as compared to powdered cube in combination with sulfur. It has also been shown that a 14-day interval between dippings for the short-nosed cattle louse is not practical, as not all of the eggs will hatch in that time. A 17-day interval, and no less, is absolutely essential."

Effect of phenothiazine on milk.--Tests of the effect on milk of feeding phenothiazine to lactating cows was continued at the Dallas, Tex., laboratory. It will be recalled that this chemical has been shown to have some inhibiting effect on the breeding of the horn fly in cow manure. We quote a passage from the report of W. G. Bruce: "One animal was fed phenothiazine, in bran, at the rate of 1 gram per hundredweight twice daily. Milk samples were collected twice daily. Milk collected 24 hours after the first dose of phenothiazine and all subsequent samples had a reddish color of various intensity. Milk from another cow fed the same dose, but only once daily, showed no distinct color change; however, the samples of milk had a faint reddish tinge. The cow that was fed the fewer doses refused to consume all the medicated bran on some occasions."

Correction.--In the News Letter dated February 1, 1940 (v. VII, No. 2, p. 22), under "Field tests on natural screwworm cases," line 11, the sentence beginning, "Although slightly less effective, etc." should read, "Although diphenylene oxide proved slightly less effective than diphenylamine, this material may be a practical treatment in screwworm control because of its low cost and because of its advantage over diphenylamine in that it does not cake upon exposure to high temperatures."

FOREIGN PLANT QUARANTINES

Entomological interceptions of interest.--Two larvae and 1 pupa, all living, of the Mediterranean fruitfly (*Ceratitis capitata* Wied.), were intercepted at New York on October 23, 1939, in a box containing 4 pears and 4 apples in baggage from Germany. A living specimen of the mirid *Fulvius bisbistillatus* (Stal) was taken at San Francisco on November 27, 1939, on an orchid (*Cattleya*) in cargo from Colombia. Living specimens of the whitefly *Aleurodicus* (*Metaleurodicus*) *manni* Baker arrived at Brownsville, Tex., on November 7, 1939, on gardenias in cargo from Mexico. Living specimens of the lygaeid *Nysius minutus* Uhl. were found at El Paso, Tex., on October 10, 1939, on a leaf of mustard greens in cargo from Mexico. Living specimens of the whitefly *Aleuroplatus* (*Orchamus*) *mammaeferus* Q. & B. were intercepted at Philadelphia on October 2, 1939, on *Codiaeum* leaves in ship's quarters from Japan. A living specimen of *Lygaeus poeyi* Guer. arrived at New Orleans on November 2, 1939, on a banana fruit in cargo from Mexico. A living adult of the erotylid *Aegithus clavicornis* L. was found at Galveston, Tex., on November 6, 1939, with banana debris in cargo from Mexico. A larva of the lycaenid *Cosmolyce boeticus* (L.) was taken at Baltimore on November 25, 1939, in a green soybean pod in ship's stores from Japan. A living specimen of the mirid *Sixeonotus areolatus* Kngt. arrived at Eagle Pass, Tex., on November 22, 1939, on head lettuce in baggage from Mexico. Specimens of the coccid *Halimococcus lampas* Ckll. were intercepted at Washington, D. C., on June 20, 1939, on fruits of *Bismarckia nobilis* in the mail from France.

Bitter orange a preferred host of Mediterranean fruitfly.--Two vessels, each containing a quantity of bitter oranges from Italy for the marmalade factories in Canada, arrived in New York late in February. The fruit on both vessels was found to be infested with *Ceratitis capitata* Wied., and adults were observed crawling on the cases and on the ceilings of the compartments in which these oranges were stowed. These compartments were closed and fumigated with HCN. This fumigation included the fruit. After fumigation the fruit was permitted to move, under safeguard, by rail to Canada. Through the splendid cooperation of the Division of Plant Protection of Canada, the railway cars have been carefully swept and cleaned in Canada before being permitted to return to the United States. After the fruit had been removed, the compartments in which it had been stowed were again fumigated with a larger dosage of cyanide. This second fumigation was given for the reason that both these vessels were due to make stops at southern ports. The debris from the stowage compartments was swept together and specimens of the fruitfly were taken from it. In the debris taken from one of the ships there were 11 adults, 55 larvae, and 918 puparia, all killed. From the debris of the other vessel there were gathered 142 adults, 11 larvae, and 292 puparia, also all dead. After all the safeguards had been accomplished the vessels were allowed to clear for southern ports.

Mite on Mexican garlic.--Specimens of Mexican garlic sent in during October and November 1939 as diseased frequently showed a flabby or slightly shrunken condition of the outer fleshy scales, which had a "mealy" appearing surface. Examination with a hand lens did not reveal any organism, but microscopic examination revealed the presence of tiny mites which have been determined by H. H. Keifer, of the California State Department of Agriculture, as *Eriophyes tulipae* Keifer. The mites were found only on garlic which appeared to be rather newly harvested, the stems being moist and still flexible.

Bacterial names to be changed.--The Division of Mycology and Disease Survey, whose decisions as to nomenclature are closely followed in plant disease notes in the News Letter and other data issued by this Division, has decided to adopt the recommendations of the American Society of Bacteriologists with respect to the names of bacterial organisms. This means that a number of names of common organisms will be changed. A list of the changes of particular interest to this Division will be prepared and issued to the ports.

Tomato diseases from Mexico.--During the tomato-shipping season several inspectors on the Mexican border have been making a special effort to learn to distinguish the different bacterial fruit spots and the different *Phytophthora* rots. Both problems "stump" the specialists rather frequently, but it is believed that intensive study on the part of the inspectors, who have unusual quantities of such material to inspect and study, will enable them to become as proficient in the detection and determination of the tomato diseases as is practicable without the use of culture or other time-consuming methods. Interceptions of *Bacterium punctilans* Bryan (determinations made or verified by S. P. Doolittle) made at Nogales early in February were the first authentic interceptions of the "speck" disease which apparently cannot be distinguished from small lesions of bacterial spot (*Bacterium vesicatorium* Doidge) in many cases.

New rust in air express.--The rust mentioned in the News Letter dated March 1, 1939 (v. VI, No. 3, p. 21, line 4) has since been described by George B. Cummins in the Bulletin of the Torrey Botanical Club (67:75, 1939). It is now *Uredo wakensis* Cummins, intercepted at Honolulu on February 22, 1938, on *Tournefortia* sp. in air express, from Wake Island.

Another new species of nematode.--A species of *Panagrolaimus* found at New York on *Nelumbium nelumbo* root on November 11, 1939, in cargo from Cuba appeared to Inspector Bassen to be new. This was verified by Dr. Steiner, of the Bureau of Plant Industry, who suggested that Mr. Bassen publish the description. Data for the publication are being assembled.

A new form genus of the Moniliaceae.--That plant quarantine inspectors frequently contribute to the sum total of scientific knowledge is again demonstrated by the recent publication in Mycologia (v. XXXII, No. 1, pp. 23-30, Jan.-Feb., 1940) of a paper, "A New Form Genus of the Moniliaceae" by Donald P. Limber, of this Division. This paper is the outgrowth of studies begun when a fungus, which when examined under a hand lens appeared to belong to the form genus *Verticillium*, was found on the dead roots of a plant of *Yucca treculeana* of Cuban origin. The new genus

Tritirachium includes those members of the tribe Verticilliae in the family Moniliaceae which are distinguished by the characteristic zizag form of the fertile portion of the conidiophores which simulate the rachis of a wheat spike. The species assigned to this genus include T. dependens and T. album, which Mr. Limber described and illustrated as new, and a new combination, T. spicatum, a fungus previously described by Ferraris as Sporotrichum flavicans Fries var. spicatum.

A banana leaf disease.--A careful examination in February of dried banana (Musa sp.) leaves from Brazil, which were used as packing material in cases of wild orchids inspected at Washington, disclosed a fungus resembling Mycosphaerella musae (Speg.) Syd. The perithecia on the banana material were definitely smaller than those described for M. musae, but in all other respects it was identical with this species. Similar material taken from banana shipments has been received from various ports. Dr. Gerold Stahel, of Surinam, while studying Cercospora musae Zimm., found a species of Mycosphaerella associated with it and possibly its perfect stage. As the name "musae" was already in use, he proposed to call this species M. minima, the perithecia being exceedingly small. It seems likely that the material intercepted and having small perithecia is this form, at least in part.

A disease on Araucaria seeds.--A Cryptospora was found on the seeds of Araucaria excelsa received at Washington, D. C., from New Zealand in 1933. The fungus, Cryptospora longispora, has only recently been described by Servazzi who notes that his fungus was proved to be pathogenic by inoculations and was the cause of a serious disease of the plant. The fungus found at Washington seems to be identical with Servazzi's, except that the spores are slightly shorter.

DOMESTIC PLANT QUARANTINES

Crickets and 'hoppers hatching.--With the first of March, grasshoppers began to appear in large numbers in nets of inspectors conducting the Egyptian alfalfa weevil survey. Their hatching followed a short rainy period characterized by strong winds. Following the rainy period warm weather up to 80° F. in the sun prevailed. In Arizona grasshoppers were hatching at Yuma, damaging cantaloup and melon seedlings on March 4. The poison bait left over from last year's control operations was released for spreading in this area.

Grasshopper bait needs for 1940.--Nearly 118,000 tons of bait will be needed for grasshopper control in 1940, according to adjusted estimates for the 24 States. The average percentage of infestation in each county was derived by averaging survey ratings given to a representative infestation within that county. These ratings have been converted into percentages of predetermined acreages of grasshopper-susceptible crops, such ratings being based on counts of grasshoppers per square yard and egg pods per square foot in places known to be suitable for their reproduction and development. In other words, this percentage is an average of conditions applied to the total amount of bait needed for the most efficient control for a maximum infestation. After determining the average percentage of infestation, or, in other words, the percentage of crops infested, the method of estimating quantities of bait (dry) needed for control in each county has been as follows: The total crop acreage (grasshopper-susceptible crops in each county) x percentage of infestation (in decimal form) x 10 pounds of bait (dry) per acre = pounds of bait needed.

Savings under grasshopper control work over a 5-year period.--In reviewing the results of the grasshopper control work for the last 5 years, it is found that the total of the estimated savings and losses amounts to $757,501,833, or more than three quarters of 1 billion dollars. It is seen that the average annual problem for the 5 years has amounted to $151,500,366 The following represents savings per bait ton during the last 5 years: 1935, $700; 1936, $880; 1937, $1,290; 1938, $1,255; and 1939, $836. The decreased values during 1939 resulted from the baiting for protection of nearby crops of range and idle lands where savings are necessarily less than in good crop sections.

Program on white-fringed beetle control worked out.--The outline of control work on the white-fringed beetle for the current year, as worked out with the cooperating States, is based on the methods of control which have been found most effective in the last 2 years, and takes into consideration the vulnerable points of attack in the life history and habits of the beetle, as determined by research. The objectives include the early eradication of the beetle in certain isolated areas, drastic suppression of the beetle population in all other areas, and prevention of natural and artificial spread. Intensive surveys will be undertaken, it is anticipated, in and adjacent to infested areas, and along railroad rights-of-way leading therefrom, as well as at other points in the Southeastern States. The control methods include the application of herbicides and insecticides, soil treatment, and the use of fumigants, and place considerable emphasis on clean-culture practices on cultivated lands, pasture land, open range adjacent to fields, vacant lots, and garden plots. During the month of February there was considerable activity in determining acreages of crops in the infested area and in contacting farmers relative to their planting programs. The clearing of 1,200 acres of land in preparation for the control work in the coming season was accomplished by W. P. A. crews. The County A. A. A. Committee of Walton County, Fla., has worked out a benefit-payment plan whereby farmers on infested farms can leave strips in their regular crops to allow for the passage of dusting equipment, and by planting these strips to certain legumes, they will receive payment. The plan is under consideration in other counties.

Work program for sweetpotato weevil control.--The program of work proposed for the current year on the sweetpotato weevil control project, as arranged with cooperating States, provides for a resurvey of 83 counties in Alabama, Georgia, Mississippi, and Texas, and the extension of survey work into 7 additional counties in these States. Such work comprises the inspection of sweetpotato beds, fields, storage places, and wild host plants. The project will be carried along the same general lines as previously with the same objectives of (1) eradication, if possible, of the sweetpotato weevil from the commercial areas which lie north of that section along the coast where wild host plants are rather generally established and where infestations exist, and eradication in isolated areas or in other districts where such action seems feasible; (2) extending the surveys north of the known infested areas to determine the extent of infestations; and (3) to set up control areas from which host plants will be eliminated, for the protection of areas where the weevil has not been found or where eradication is undertaken. No change in methods of eradication is contemplated. Educational activities will be continued in cooperation with the county agents and agricultural teachers. Publications and quarantine notices will be distributed. Meetings will be held with growers. Motion pictures of the weevil and of the work of the project will be shown.

New findings of the Egyptian alfalfa weevil.--In February inspection for the new species of alfalfa weevil resulted in finding that infestations in the Yuma, Ariz., area were more widely extended than was previously known, having been found at 17 additional points in the Yuma Valley, extending the known infestations, thus far, 4 miles west and 8 miles south of Yuma, and to a point 1½ miles from the Mexican border. Specimens were also taken for the first time at 1 point each in the North Gila and South Gila Valleys, in Yuma County. The finding of larvae and adults in a very limited area at Tempe, Ariz., in a preliminary survey of the Salt River Valley, represented the first record of taking *Hypera brunneipennis* (Boh.) outside the Yuma area. In Imperial County, Calif., sweeps at 45 points resulted in finding infestations at 2 points adjacent to those of the Yuma Valley and at 1 point about 3 miles from the infestation in the North Gila Valley. Scouting in the Imperial Valley from February 26 to March 5 at 186 points where the occurrence of the pest was considered most likely, brought negative results.

Transit-inspection forces increased.--Arrangements are being made for the assignment of an inspector for the spring nursery-stock shipping season at each of the stations of Dallas, Memphis, and Birmingham, for the more effective enforcement of white-fringed beetle and cotton quarantines. The forces at Chicago, Omaha, Atlanta, and New York, are being increased by the addition of one or two inspectors at each of these stations, and such work is being resumed at Indianapolis and Detroit, with a Michigan State inspector also being assigned at the latter city. The regular force is maintained at Philadelphia, Pittsburgh, Boston, Jacksonville, and Kansas City. Through the transfer of the inspector formerly located at Springfield, Mass., transit inspection was initiated at Buffalo on February 23, an important transfer point for the examination of west-bound shipments of mail, express, and freight from regulated areas in the Northeastern States. Of special comment on the part of the Buffalo inspector is the eagerness of all carrier employees to cooperate in the work. At Pittsburgh more time is being devoted to freight and express shipments than heretofore, as it is believed that violations found in such shipments are generally more serious than those found in the mail. The inspection tours at that point are being rearranged accordingly.

Exhibits for Sportsmen's Show at New York checked.--Transit inspectors at New York report that the arrival of material for the Sportsmen's Show held at the Grand Central Palace on February 17-25 necessitated devoting considerable time to the checking of large shipments of such material as birch, oak, white pine, cedar, juniper, spruce, ornamental shrubs, logs, birch bark, and rocks. One large shipment was found uncertified and it was necessary to inspect it and oversee its complete destruction after the show closed.

Citrus canker activities.--The month of February marked the completion of the inspection of citrus trees in Houston, Tex.; which resulted in finding 17 hedges of *Citrus trifoliata* in the city. Work was then extended to the highways on prairies extending west to the rice-growing section. Cooperative inspection was resumed in Louisiana on January 31, and 2 types of work were begun: (1). House-to-house inspection in the parishes of St. Martin, St. Landry, and Lafayette, particularly in places where canker has been found in recent years; and (2) systematic inspection along the banks of the Mississippi beginning at Vacherie, St. James Parish, and extending north and south. Work was started along Bayou Teche on the Iberia-St. Martin Parish line in the area where the French who were deported from Nova Scotia first settled in about 1755. A crew at Thibodaux, La., working properties where canker has been located in recent years, reports that some citrus trees are being found.

CONTROL INVESTIGATIONS

Mixtures of nicotine with naphthalene found promising.--H. H. Richardson and A. H. Casanges, of the Beltsville, Md., laboratory, found that the addition of low concentrations of nicotine (4 to 6 micrograms per liter) to toxic concentrations of naphthalene, increased the efficiency against the greenhouse whitefly in exposures of 15 to 75 minutes, at 77° F. The speed with which the whiteflies were paralyzed by the mixture was also increased. Changes in relative humidity seemed to have little effect on efficiency. Against the green peach aphid, the addition of small concentrations of naphthalene to toxic concentrations of nicotine did not increase the mortality of aphids, but the mixture appeared compatible. The combination of the two gases seems worth testing under practical conditions.

P-dichlorobenzene in areosol form effective against certain household insects.--W. N. Sullivan, E. R. McGovran, and J. H. Fales, of this Division, in cooperation with L. D. Goodhue, of the Division of Insecticide Investigations, and W. M. Davidson and S. C. Billings, of the Food and Drug Administration, report promising results of preliminary tests using p-dichlorobenzene in areosol form against certain household insects. In this work 40 cc. of a safrole solution containing 0.5 gram of p-dichlorobenzene per cc. of solution was sprayed on a hot plate (temperature 380° C.) within a 50-cubic-foot cabinet. After a 24-hour period of exposure the insects used in this test (see table) were held for observations in the usual manner. The results of these tests are shown in the following table.

Test No.	Material tested	Concentration	Insect tested	Insects tested	Effectiveness in 1 day	Effectiveness in 4 days
				Number	Percent	Percent
1------	p-dichlorobenzene	20 g. of p-dichlorobenzene in 40 cc. solution	*Tineola bisselliella* (larvae)	30	--	100
2------	do.	do.	*Periplaneta americana* (nymphs and adults)	80	--	100
3------	do.	do.	*Blatta germanica* (nymphs and adults)	40	100	--
4------	do.	do.	*Musca domestica* (adults)	150	100	--
5------	do.	do.	*Attagenus piceus* (larvae)	40	--	95

It is of interest that clothes moth and carpet beetle larvae were effectively controlled, using about one-tenth the usual dosage of p-dichlorobenzene. The high mortality obtained against roaches indicates promise in this line of investigation.

INSECTICIDE INVESTIGATIONS

Deguelin in derris and cube.--Deguelin is recognized as being the insecticidal constituent in derris and cube which is next in importance to rotenone. L. D. Goodhue has recently published a method for its estimation. After the rotenone and alkali-soluble portion of a derris or cube extract are removed by appropriate means, the remaining resin is treated with methanolic alkali, which racemizes it and permits it to be recovered by crystallization from carbon tetrachloride in the form of a 1:1 solvate. Thirteen samples were examined; the derris samples showed from 0.24 to 3.9 percent, the cube samples from 0.25 to 2.3 percent.

A definite measure of inherent toxicity.--For some years an attempt has been made in this Division to put the study of inherent toxicity on a strictly quantitative basis, with the intention of seeking a possible correlation between toxicity and chemical structure. It has been found that the use of the goldfish as the test animal eliminates many of the experimental difficulties that would necessarily obtain with the use of an insect in such a fundamental research. Since toxic action is an action in time, it was believed that for quantitative measurements it was necessary to measure time and therefore toxicity was defined with respect to the two variables, concentration and survival time. It has been emphasized that the relative toxicity of two substances may differ throughout the course of toxic action as expressed by these two variables and this is especially true of dissimilarly acting poisons such as, for example, rotenone and phenol. For this reason the minimal product of the two variables was suggested as a readily obtainable criterion of relative toxicity. Since there was a fear that it might be impossible to express the relative toxicity of compounds differing as greatly in speed of action as the two compounds mentioned, they have both been repeatedly used as standards of comparison in the work. In the four times they have been used in studies with different populations from the same breeding ponds, the relationship as expressed by the minimal product of concentration and time has been nearly the same despite a shifting with respect to the two variables for each population. This criterion appears, then, to measure a definite parametric characteristic of this test animal. This conclusion is again being brought out in a statistical analysis of a further study of the toxic action of the same two substances in which the temperature, necessarily held constant in the previous work, is treated as a third variable. Because of this definiteness, this work shows that toxicity for each compound, when measured according to the greatest efficiency with respect to concentration and time, increases geometrically as temperature increases arithmetically, at least between 7° and 27° C. As a corollary it follows that between these temperatures the relative toxicity of phenol and rotenone is the same at any definite temperature.

Additional organic insecticides patented.--Four United States patents covering synthetic organic compounds as insecticides have been granted members of the Division recently. Three of these were issued to L. E. Smith and the other to Milton S. Schechter and H. L. Haller. Patent Number 2,191,299 covers the use of iodoxybenzene and the three isomeric nitro derivatives. Patent 2,191,300 is concerned with the use of iodosobenzene and the ortho, meta, and para-nitroiodoso-benzenes. Patent 2,191,301 claims phenyliodochloride and mono-nitro derivatives thereof as insecticides. Patent 2,189,570 includes compounds of the class represented by alpha, beta dibromoethyl-benzene and alpha, beta-dibromo-beta-nitroethyl benzene.

BEE CULTURE

Lack of pollen in liquid food may cause supersedure.--Frank E. Todd, Davis, Calif., reports: "A colony on honey stores, stimulated by incoming pollen on favorable flight days, was expanding the broodnest normally for the period of the year. We wished to test a theory that it was the pollen in the nectar or honey which acted as a stimulus for egg laying. The honey stores (which contained pollen) were removed and the colony fed on sugar sirup. The honey was removed on January 6 and a rapid decline in egg laying followed, to the point where by January 15 no eggs were being laid. The colony was in a glass observation hive. The weather was such that field activity during this period was nil until January 26. On this date, although the colony was undisturbed by us, the bees were observed 'balling the queen.' This is a method used by bees to destroy a queen. They form a compact ball over her in an apparent attempt to smother her. We immediately fed the colony sugar sirup in which was suspended pollen. The queen was laying actively the next morning. This experiment suggests a possible cause of supersedure in package-bee colonies, as bees apparently react differently to the presence of a queen under different conditions. Thus, the nonlaying queen has been noted walking in the winter cluster with no more attention being paid to her than any other member of the colony, although a laying queen is usually surrounded by a "royal ring of bees," and appears to be constantly attended. It appears possible, therefore, that when conditions occur which cause a sudden cessation of egg laying, such as lack of pollen in liquid feed, the bees react by attempting to ball the queen, as they might do in case of a failing queen. This behavior may be a factor in the early supersedure of queens in package colonies, as conditions in this case were similar to those which might be encountered in the early spring in areas receiving package bees."

Food consumption by emerging bees.--C. L. Farrar and C. W. Schaefer, Madison, Wis., report that pollen "cakes" or pollen supplemented with "nutrisoy" are consumed much more rapidly when young bees emerge than when a similar number of larvae are being fed without the presence of emerging bees. The following amount of food (dry weight) was consumed per young bee reared between December 5 and January 30: 0.92 g. (pollen); .078 g. (50 percent pollen + 50 percent nutrisoy); .062 g. (25 percent pollen + 75 percent nutrisoy); .062 g. (12.5 percent pollen + 87.5 percent nutrisoy); .048 g. (nutrisoy). Most pollens contain from 20 to 25 percent protein; nutrisoy, 50-52 percent. The pollen fed was from mixed sources obtained by trapping at the entrance of the colonies. The average numbers of bees reared per colony were respectively 8,800, 7,300, 5,500, 4,900, and 2,600, with two check colonies producing 350 and 800 each. One colony receiving 50 percent pollen reared as much brood as the best colony on pollen alone; the second reduced the average because of delayed egg laying by the queen. Twenty-five percent pollen is superior to 12.5 percent largely because the food remains in better condition over a longer period.

Variation in cultures of Bacillus larvae.--Laboratory tests have shown that cultures of *B. larvae* White, isolated from various localities, exhibit physiological strain differences, it is reported by E. C. Holst, Laramie, Wyo. Whether these strains vary in their pathogenicity, as well as in their physiological properties, remains to be determined. Further, apparently stable strains of *B. larvae* were induced to form mutant or "abnormal" strains by cultivation upon suitable media. These mutant strains, when returned to the stock culture medium, again reverted to the "normal" type.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Additional record for an apparently important anobiid beetle.--*Hadrobregmus destructor* Fisher (family Anobiidae) was described in 1938 (Jour. Wash. Acad. Sci. 28:26) from specimens received from Sitka, Alaska, where the species was said to have caused serious damage to wooden articles in the Sheldon Jackson Museum and to wooden columns of the building. Its work is similar to that of the European "death-watch" beetle, *Anobium punctatum* Deg., which it superficially resembles. Recently specimens, determined by W. S. Fisher as *H. destructor*, were submitted by the Division of Foreign Plant Quarantines. They had been intercepted at Seattle, Wash., in yew logs coming from Victoria, British Columbia, but the origin of the logs has not been determined.

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Identity of weevil attacking canaigre.--In the October 1, 1939, issue of the News Letter (v. VI, No. 10, p. 21) there appeared a note regarding a large weevil attacking canaigre (*Rumex hymenosepalus*) at Las Cruces, N. Mex., where the plant is being grown experimentally as a source of tannin. At that time a single reared specimen was identified tentatively as *Ophryastes tuberosus* Lec. On February 28, 1940, 14 specimens of the weevil were collected on the soil close to canaigre plants at the same locality. With this series available, it is possible to confirm the previous identification. At the time the adults were collected, partially grown larvae were dug from the soil around the roots of the food plant, and it is probable that this species has a 2-year cycle. Apparently the larvae hatch in the spring and feed on the roots of the canaigre for more than a year before pupating, the adults emerging at the end of the second summer.

A new mosquito record.--Frank W. Fisk, of the *Aedes aegypti* Control Unit, Public Health Service, has recently submitted adult males and females, larvae, and larval and pupal skins of *Deinocerites spanius* (Dyar and Knab). Some of the adults were trapped at Brownsville, Tex., last December and others were reared from larvae collected in crab holes within 2 miles of the airport in February. This species has hitherto been known only from many adults collected in the Panama Canal Zone, on the Atlantic side. Larvae of the genus *Deinocerites* are usually confined to crab holes, but those of *D. spanius* may also occur in old tins. This species will attack man, and it is possible that it was brought to Brownsville by plane and became established there.

Specimens of the elephant bot received.--Four bot-fly larvae, determined by C. T. Greene as *Cobboldia elephantis* Cobb, were recently submitted by H. L. Van Volkenberg, of A. and M. College of Texas. They had been taken from the stomach and duodenum of a baby Indian elephant at Los Angeles, Calif. This elephant, 2 years old, was owned by the M. G. M. Studios and died about 3 weeks after arrival in this country.

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